Conserve O Gram

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Curation Of Insect Specimens

Storage of Insect Specimens

Insect specimens are prepared and preserved in a variety of formats depending on a number of factors such as life stage, collecting method, species group, and/or research objective. These factors determine curation objectives. Storage options will also depend on the extent and diversity of your collection. In general, insects are collected and/or stored as dried specimens or in fluids. An introductory text on entomology such as Borrer, et al (1989) will provide general principles for collection, preparation, and storage of insect specimens. The World Wide Web is another great source of information. Be aware that there may be exceptions to every general rule.

Figure 1: Various curation methods for insects.



Insects may be preserved either as dried or wet specimens. Dried specimens may be preserved on pins, mounted on points, or in envelopes. For pinned specimens, larger insects are pinned through their bodies and smaller insects are mounted on points. In larger collections not all specimens of butterflies and moths may be pinned. Some may be stored in glassine envelopes. The current standard for curating large collections of dragonflies and damselflies is placing specimens and supporting cards in clear envelopes.

Figure 2: Insect specimen curation in unit trays placed in drawer within entomology cabinet.



Dried, pinned insects are generally stored in unit trays that are placed in insect drawers which are housed in entomology cabinets. However, a small collection may be housed in

a series of boxes (preferably with tightly fitting lids) and placed within a well-sealed cabinet for added protection against pests. Dried specimens in envelopes are stored in appropriately sized boxes in drawers and cabinets. Ideally, collection organization should follow a taxonomic arrangement to the family level, after which genera and species can be organized alphabetically.

Figure 3: Storage of wet specimens, one option.



Insects collected in fluids may remain in fluid, be transferred to another fluid, or pinned, if appropriate. Collection fluids other than 70% alcohol are usually used for initial preservation purposes and not for long term storage. In general, all soft bodied insects should remain in 70% alcohol, whereas hard bodied specimens can be removed from alcohol, rinsed, relaxed if necessary (see relaxing specimens below), and pinned. There may be reasons to keep whole samples in alcohol. For example, it may be more efficient to keep fish stomach samples complete in individual vials rather than separate and pin some specimens.

Specimens in alcohol can be stored in individual vials or in shell vials within larger museum jars. How wet specimens are stored will depend on the extent and purpose of the collection. Tightly fitting seals will reduce evaporation of alcohol and subsequent curatorial time and materials in maintaining these types of specimens. Larger collections will have dedicated storage for wet specimens. If your collection is small, there are unit trays for vials for use in insect drawers.

Figure 4: Two methods for relaxing insects.



Relaxing chamber.



Relaxing beetles in hot water.

Dried unprocessed specimens will need to be "relaxed" before pinning. There are a number of ways to relax specimens. A relaxing chamber can be created by placing damp paper towels in the bottom of a sealed container.

Insects are placed in the chamber on platform above the damp substrate. Specimens will take from a couple hours to two days to relax. Adding a couple crushed cloves will prevent mold when relaxing larger, hard bodied insects that may take longer to soften. Most beetles, which are hard bodied, can be quickly relaxed by placing them in a hot water bath (almost, but not boiling) with a drop of detergent for 5-10 minutes. When softened they should be rinsed with another hot water bath and set out to dry for a minute before pinning.

Figure 5: Specimens on pinning blocks.





Careful pinning of relaxed insects will greatly enhance their safekeeping. Insects should be pinned on foam blocks that provide support for the body as it dries as well as allowing for wings, legs, and antennae to be positioned close to the body making them less likely to be knocked off when moved. Insects that take up less space can be pinned closer together and thus stored more efficiently. Pins have a number system that is relative to their thicknesses but numbers 2 and 3 are the most commonly used. After drying, the specimen is handled only by the pin and adequate space must be left above the specimen

Figure 6: Pin placement

From USDA website for Systematic Entomology

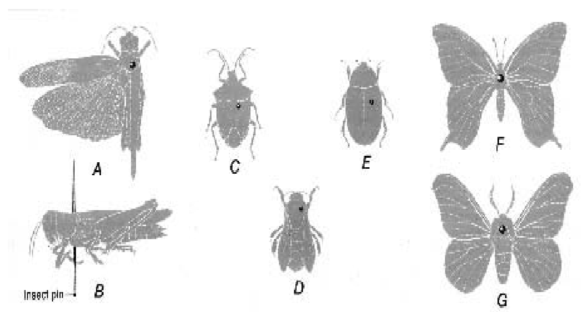


Diagram showing proper pin placement for mounting various types of insects A & B) grasshopper, C)true bug, D) bee, E) beetle, F) butterfly, G) moth

Pins are placed as follows:

Most insects: pin through thorax to slightly to right of midline

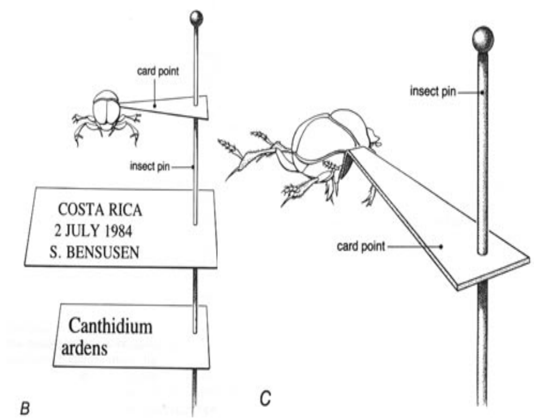
True bugs: pin through scutellum slightly to right of midline

Beetles: pin through base of right wing cover (exit between mid and hind legs)

Butterflies, dragonflies, and damselflies: pin through middle of thorax

Figure 7: Mounting insects on points.

From USDA website for Systematic Entomology

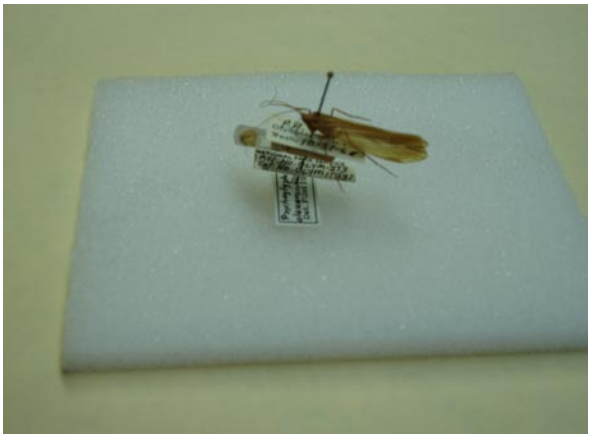


B) Correct positioning of point and labels on pin. C) Attachment of card point to right

Small insects of any group should be mounted on points. Points are made with a point punch which creates triangular shaped pieces of card-stock. The insect pin goes through the wide end of the point and the small insect is glued to the narrow point. The point can be curved with forceps to provide additional support for the specimen. Use as little glue as possible and be careful not to obscure any identifying characteristics. The point is glued to the right side of the insect so heads all face right. Very tiny and/or fragile specimens are sometimes double mounted (see references and web pages for details).

Figure 8: Position of labels underneath specimens.





Specimen with various labels as well as genetalic vial (containing dissected genetalia).

Insect labels for most pinned specimens may vary somewhat in size but ideally should not be larger than 2 x 1 cm. Labels are place on the pin below the insect with the top of the labels facing right. Ideally, multiple labels are placed at intervals so they can all be read without moving them. However, if there are too many labels they will have to be compressed. This could happen if a specimens was identified a number of times by different researchers who should each add their own label. No labels should ever be removed (except field collection labels).

Label data for insect specimens is limited due to small label size however, the following data should be included: country, state, county, location, UTMs, elevation, collection date, collector, and collection number, when provided. Collection method or habitat data, if given, can be added to the label if there is room. Habitat data is sometimes placed on a second label. A label with accession and catalog numbers will also need to be created.

Example:

USA: WA: Clallam Co.,
Olympic National Park
near Elwha Campground, 320 ft.
UTM: 10 / 456212 / 5319339
22 Aug.2000, Coll. D. Smith #4

Figure 9: Specimens lined up by species in unit tray.



Due to the diversity of insect species and sheer numbers of representatives, space is of utmost importance in the storage options of insects. Pinned specimens should be labeled with appropriately sized labels and pinned in rows in unit trays as closely together as possible while maintaining enough space to remove individual specimens from the tray. The first specimen of a species should have the identification label turned 90 degrees to the left so it can be read without turning the unit tray. Individuals of the same species can be lined up evenly in rows until the next species which will start a new row as before.

Insects are fragile and with use and over time appendages may fall off. Tarsi, legs, and antennae can be glued back on. White glue has been traditionally used. White glue has the advantage of being reversible with warm water. If it is not possible to reattach the appendage, another option is to glue it to a card and pin the card directly underneath the specimen above all the labels. Be ABSOLUTELY certain that whatever is being reconnected definitely came from that specimen. Accuracy of data is very important.

A few common pests can wreak havoc in insect collections. Pests can either be local species or introduced from incoming collections. Thus, incoming collections must be carefully inspected. A reference on museum pests appropriate to your area will aid in their detection, identification, prevention, and control. Inspect insect drawers frequently. If an infestation is discovered, freeze the entire drawer, box, or container for at least 2 weeks.

Light can quickly damage insect specimens. A piece of cardboard placed over the glass top will effectively keep light off the specimens while a drawer is removed from its cabinet and not in immediate use.

Shipping of Insect Specimens

The study of insects is still in a stage of intense activity. New species are described with regularity and taxonomy continues to be updated. The field of entomology is overwhelming in scope and entomologists specialize in particular groups for study. Thus, at some point, you may need to ship insect

specimens in your collection for identification and/or research. Insect specimens can be easily shipped with proper care.

Figure 10: Shipping and packing boxes.

From USDA website on Systematic Entomology.



A box of specimens being readied for shipment. Note that ample room has been left on all sides of the specimen container for cushioning material.

Side pinning of larger insects.



Shipping boxes can be standard storage boxes or specially designed lightweight cardboard boxes. Dried, pinned insect specimens can be pinned into a foam-lined shipping box. Older, hard liners do not provide adequate cushioning and transfer more shock to specimens during shipping.

Large insects require side pinning to prevent the specimen spinning into contact with adjacent specimens. The pins must be strategically positioned to avoid any damage to the specimen. Many of the large, heavy insects are beetles which, for the most part, have hardened elytra against which the bracing pins can be placed. If it is impossible to brace a large insect then it should be given ample room to swing without touching another specimen or placed in a separate box. Type specimens such as holotypes, allotypes, and lectotypes should be placed in separate boxes so that any appendage lost during shipment can be correctly associated.

The shipping box should have a strip of cotton pinned along the bottom of the box to catch any pieces of insects that may come loose during shipment. To keep pins from coming loose a piece of cardboard should be placed on top of the pins within the box. Padding should be added to the space between the cardboard to prevent shifting.

The shipping box should be wrapped in paper and a destination label attached on the outside. This box should then be placed in a larger packing box with at least 5 cm of shipping materials such as foam peanuts on all sides of the shipping box. The packing box is then wrapped in paper with the address label attached. Other recommended labels can read 1) FRAGILE and 2) Dead insects for scientific purposes. Of no commercial value.

Wet specimens can be shipped in vials or jars. Specimens should be braced in their container with a bit of cotton they are not subject to excessive movement. If vials are within jars they too should be braced with cotton so there is no movement or knocking of glass against glass. Containers with wet specimens should be wrapped with padded material and placed in sturdy plastic bags in case of breakage. Ensure

there is plenty of padding in the packing box to protect the number, size, and weight of the shipped containers.

Information sources:

There are many ways to get more information about collecting, curating, and caring for insect collections. A web search using keywords such as insects, entomology, or voucher specimens will provide numerous web pages with a variety of interesting and useful information. Acquiring general insect references for your particular locale can be immensely helpful. There are also national and local insect organizations and groups which can provide current updates on conservation issues.

References:

Borrer D.J., C.A. Triplehorn, and N.F. Johnson. 1989. *An Introduction to the Study of Insects*, 6th edition. Saunders College Publishing, San Francisco.

Dunn, Gary A. 1994. *A Beginner's Guide to Observing and Collecting Insects.* Young Entomologist's Society, Lansing, MI.

Peigler, Richard S. 1992. Shipping of pinned insects. *Collection Forum* 8(2): 73-77.

Vendor for entomological supplies:

BioQuip website: www.bioquip.com

Useful web pages:

http://www.ars.usda.gov/Main/site_main.htm?docid=10141&page=1*

This is the USDA site for Systematic Entomology and provides great detail on all aspects of collecting, preserving, and shipping of insects.*

* This manual is an updated and modified version of the USDA Misc. Publication no. 1443 published by the Agricultural Research service in 1986 and Edited by George C. Steyskal, William L. Murphy, and Edna M. Hoover.

http://www.ars.usda.gov/Main/site_main.htm?docid=10141&page=9

Page 9 of the USDA site for Systematic Entomology contains information on specimen preparation.

http://entowww.tamu.edu/links/collect1.html

This site provides simple instructions for collecting and preserving insects.

http://members.aol.com/yesclub2/tip003.html

This site provides a variety of methods for relaxing dried specimens.

http://bohart.ucdavis.edu/bohart.asp?s=collecting&f=preserve.html

This site contains photographic images for various aspects of preparing and labeling insect specimens.

http://www.cals.edu/entomolgoy/research_vouchers.html

This site provides information on the value and importance of voucher specimens.

http://www.xerces.org/home.htm

This site provides information on invertebrate conservation issues.

Gay Hunter
Museum Curator
Olympic National Park

The series is distributed to all NPS units and is available to non-NPS institutions and interested individuals on line at <http://www.cr.nps.gov/museum/publications/conserveogram/cons_toc.html>. For further information and guidance concerning any of the topics or procedures addressed in the series, contact NPS Park Museum Management Program, 1849 C Street NW (2265), Washington, DC 20240; (202) 354-2000.